

## ABSTRACT

The present invention provides an electromagnetic drive motor assembly (EDMA) that has an inner flux return assembly formed from an upper pole piece and a lower pole piece oppositely disposed relative to each other along the center of the EDMA. An annularly positioned conductive ring (or flux stabilization ring) encircles the inner flux return assembly, concentrically in contact with the outside of the inner flux return assembly. Along the exterior side of the flux return pieces, is a magnet that is between a top plate and a bottom plate. Each plate contacts with the magnet to form a magnetically conductive system. A magnetic gap is formed in between the inner flux return assembly and the top and bottom plates. Disposed within the magnetic gap is a dual coil wound around a cylinder. The dual coil includes a first coil portion and a second coil portion. To minimize the modulation, the top and bottom plates may be saturated and plate tips may be provided near the magnetic gap. And to dissipate heat away from the magnetic gap, a thermal radiating conductive ring may be provided as well.